Finding an equation to a parabola (quadratic graph)

use t.p. form $y = \pm a(x \pm b)^2 \pm c$

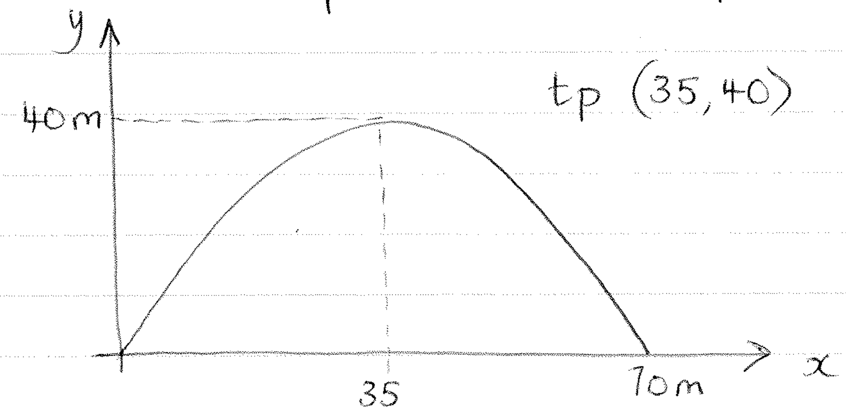
Remember t.p. can be found from this eqn.
Always $(-b, c)$

opposite sign to value in brackets — value added or subtracted (unchanged)

eg

$y = (x-3)^2 - 4$ t.p. = $(3, -4)$
$y = 2(x+6)^2 + 3$ t.p. = $(-6, 3)$
$y = -3(x - 1/2)^2$ t.p. = $(1/2, 0)$
$y = 6x^2 - 2$ t.p. = $(0, -2)$

Problem: Tiger Woods plays a chip shot that follows the shape of a parabola. He hits the ball 70m (horizontally) & it reaches a maximum height of 40m. Sketch the parabola and find an equation to represent it.



max graph so eqn must start with '−'

$y = \pm a(x \pm b)^2 \pm c$

$y = -a(x-35)^2 + 40$

∩ t.p.

We need to find 'a'

$$y = -a(x-35)^2 + 40$$

use either (0,0) or (70,0) to find 'a'.

$$0 = -a(0-35)^2 + 40$$
$$0 = -a(-35)^2 + 40$$
$$0 = -1225a + 40$$
$$1225a = 40 \qquad (+1225a)$$
$$a = \frac{40}{1225} \qquad (\div 1225)$$
$$= \frac{8}{245} \quad \text{or} \quad 0.032653\ldots$$

sub in eqn.

$$y = \frac{-8}{245}(x-35)^2 + 40$$